

1 **Amendment to the Claims**

2 **In the Claims:**

3 Please amend Claims 1, 2, 12, 71, and 73 as follows:

4 1. (Currently Amended) A modular system for producing a chemical product from a
5 plurality of reactants comprising:

6 (a) a control module, said control module being adapted to monitor and control
7 production of the chemical product by the modular system, said control module comprising a
8 processor, a reaction database, and a user interface, the control module being configured to enable a
9 user to interact with the user interface to select a specific reaction to produce the chemical product,
10 from a plurality of different reactions stored in the reaction database, so that in response to a selection
11 made by a user, the processor automatically controls the modular system to produce the chemical
12 product according to reaction parameters for the specific reaction that was selected, said reaction
13 parameters being stored in the reaction database;

14 (b) a reactant supply source for each of said plurality of reactants, a flow of each
15 reactant from its reactant supply source being controlled by the control module; and

16 (c) a first reaction module in fluid communication with each reactant supply
17 source to receive each of the plurality of reactants, said first reaction module being controllably
18 connected to said control module and including a reactor, said reactor automatically producing the
19 chemical product from said plurality of reactants under the control of the control module, said reactor
20 comprising a plurality of simple plates, the simple plates being configured such that aligned openings
21 in the plurality of simple plates achieve at least two reactant fluid pathways, at least one reaction
22 volume, and at least one product fluid pathway.

23 2. (Currently Amended) The modular system of Claim 1, wherein said reactor is replaceable,
24 and comprises a at least one mixing volume and a reaction volume.

25 3. (Previously Presented) The modular system of Claim 1, wherein at least one reactant
26 supply source and said first reaction module are configured to accommodate a reactant that is in a
27 gaseous state.

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1 4. (Original) The modular system of Claim 1, further comprising a pump module controllably
2 connected to the control module, said pump module being in fluid communication with each reactant
3 supply source and with said first reaction module, the pump module pumping at least one fluid
4 through the modular system.

5 5. (Previously Presented) The modular system of Claim 1, further comprising an additional
6 processing module in fluid communication with said first reaction module, said additional processing
7 module being disposed downstream of said reactor, such that the chemical product produced in the
8 reactor passes through said additional processing module.

9 6. (Previously Presented) The modular system of Claim 5, wherein said additional
10 processing module comprises a residence time module in which reaction of the chemical product
11 continues toward completion for a predetermined amount of time.

12 7. (Previously Presented) The modular system of Claim 6, wherein said residence time
13 module comprises a capillary passage of a length selected to obtain the predetermined amount of time
14 for said chemical product in said residence time module.

15 8. (Original) The modular system of Claim 6, wherein said residence time module comprises
16 a proportional valve, said proportional valve being controllably connected to said control module to
17 selectively vary a pressure within said modular system.

18 9. (Previously Presented) The modular system of Claim 5, wherein said additional
19 processing module comprises a second reaction module in fluid communication with said first
20 reaction module, such that a serial fluid path is created with respect to said first reaction module, said
21 second reaction module being controllably connected to said control module and including a reactor
22 that produces the chemical product from a reaction of said plurality of reactants using a plurality of
23 synthesis steps, a first synthesis step being completed in said first reaction module, and a second
24 synthesis step being completed in said second reaction module.

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1 10. (Previously Presented) The modular system of Claim 9, further comprising sufficient
2 additional processing modules, each additional processing module including a reaction module, so
3 that production of the chemical product can be achieved using additional synthesis steps that are
4 completed in succession, each additional synthesis step being completed in a different one of the
5 additional processing modules, the reaction module in each additional processing module being
6 configured to receive a product from a previous additional processing module in which an
7 immediately preceding synthesis step was completed.

8 11. (Previously Presented) The modular system of Claim 1, wherein said reactor is
9 specifically configured to enable it to produce a class of chemical products, and is selectively readily
10 removable from said first reaction module and replacable with a different reactor configured to
11 facilitate the production of a different class of chemical products, thus enabling said modular system
12 to selectively produce different classes of chemical products.

13 12. (Currently Amended) The modular system of Claim 5, wherein said first reaction module
14 further includes a housing, said housing comprising:

15 (a) a first side that includes a plurality of ports enabling said first reaction module
16 to be removably connected to said control module and in fluid communication with said each reactant
17 supply;

18 (b) a second side that includes a plurality of ports enabling said first reaction
19 module to be in fluid communication with at least one of the additional processing module and a
20 product reservoir; and

21 (c) a mounting frame for said reactor, said mounting frame being enclosed within
22 said housing, and being configured to apply a biasing force to secure said reactor in position.

23 13. (Previously Presented) The modular system of Claim 1, wherein said first reaction
24 module comprises means for facilitating production of said chemical product.

25 14. (Original) The modular system of Claim 13, wherein said means include at least one of a
26 heat exchanger, a temperature sensor, and a reactant laminar flow mixing passage.

27 15. (Cancelled)

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1 16. (Previously Presented) The modular system of Claim 1, wherein said modular system further
2 comprises a plurality of fluid paths, including a fluid path for each of said plurality of reactants, a fluid
3 path for said chemical product, at least one fluid path for a heat transfer media, and at least one fluid path
4 for a spent heat transfer media.

5 17. (Original) The modular system of Claim 1, wherein said at least one fluid path for said
6 heat transfer media and said at least one fluid path for said spent heat transfer media are configured in
7 one of a parallel fluidic system and a serial fluidic system.

8 18. (Original) The modular system of Claim 4, wherein said pump module comprises at least
9 one pump, said at least one pump being controllably connected to said control module to control its
10 operation.

11 19. (Original) The modular system of Claim 18, wherein said at least one pump is in fluid
12 communication with both a heat transfer media fluid supply and said first reaction module.

13 20. (Original) The modular system of Claim 18, wherein said at least one pump is in fluid
14 communication with both the reactant supply source for at least one of said plurality of reactants, and
15 said first reaction module.

16 21. (Original) The modular system of Claim 4, wherein said pump module comprises a separate
17 pump for each of said plurality of reactants, each separate pump being in fluid communication with the
18 reactant supply for a different one of said plurality of reactants, and with said first reaction module.

19 22. (Original) The modular system of Claim 4, wherein said pump module comprises at least
20 one valve, said at least one valve being controllably connected to said control module to control a
21 flow of one of said plurality of reactants to said first reaction module.

22 23. (Previously Presented) The modular system of Claim 4, wherein said pump module
23 comprises at least one filter that filters one of said plurality of reactants before the reactant flows to
24 said first reaction module.

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1 24. (Original) The modular system of Claim 4, wherein said pump module comprises a
2 housing, said housing comprising:

3 (a) a first side that includes a plurality of ports enabling said pump module to be
4 controllably connected to said control module, and to be in fluid communication with each reactant
5 supply source; and

6 (b) a second side that includes a plurality of ports enabling said pump module to
7 be in fluid communication with said first reaction module.

8 25. (Cancelled)

9 26. (Original) The modular system of Claim 4, wherein all connections between modules are
10 achieved using quick connect connectors that enable rapid connection and disconnection of the modules.

11 Claims 27 - 70 (Cancelled)

12 71. (Currently Amended) A modular system for producing a ~~desired~~ chemical product from
13 at least one reactant, comprising:

14 (a) a control module, said control module being adapted to monitor and control
15 production of the chemical product by the modular system, said control module comprising a
16 processor, a reaction database, and a user interface, the control module being configured to enable a
17 user to interact with the user interface to select a specific reaction from a plurality of different
18 reactions stored in the reaction database, so that in response to a selection made by a user, the
19 processor automatically controls the modular system to produce the chemical product according to
20 reaction parameters for the specific reaction selected that was selected, said reaction parameters being
21 stored in the reaction database;

22 (b) a reactant supply source for each reactant used, a flow of each reactant used
23 from its reactant supply source being controlled by the control module; and

24 (c) a first reaction module in fluid communication with at least one reactant supply
25 source to receive said at least one reactant, said first reaction module being controllably connected to
26 said control module and including a replaceable reactor, said replaceable reactor automatically
27 producing the chemical product from said at least one reactant under the control of the control
28 module, said replaceable reactor comprising a plurality of simple plates, the simple plates being
29 configured such that aligned openings in the plurality of simple plates achieve at least two reactant
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1 fluid pathways, at least one mixing volume, at least one reaction volume, and at least one product
2 fluid pathway.

3 72. (Previously Presented) The modular system of Claim 71, wherein said replaceable
4 reactor comprises a microreactor.

5 73. (Currently Amended) The modular system of Claim 72, wherein said ~~microreactor~~
6 ~~comprises a mixing volume and a reaction volume~~ at least one reaction volume comprises a plurality
7 of reaction volumes.

8 74. (Previously Presented) The modular system of Claim 1, wherein said reactor comprises a
9 microreactor.

10 Please add new Claims 75-77 as follows

11 --75. (New) A modular system for producing a chemical product from a plurality of reactants
12 comprising:

13 (a) a control module, said control module being adapted to monitor and control
14 production of the chemical product by the modular system;

15 (b) a reactant supply source for each of said plurality of reactants, a flow of each
16 reactant from its reactant supply source being controlled by the control module; and

17 (c) a first reaction module in fluid communication with each reactant supply
18 source to receive each of the plurality of reactants, said first reaction module being controllably
19 connected to said control module and including a reactor, said reactor automatically producing the
20 chemical product from said plurality of reactants under the control of the control module, said reactor
21 comprising a plurality of simple plates, the simple plates being configured such that aligned openings
22 in the plurality of simple plates achieve at least two reactant fluid pathways, at least one reaction
23 volume, and at least one product fluid pathway.

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1 76. (New) A modular system for producing a chemical product from a plurality of reactants
2 comprising:

3 (a) a control module, said control module being adapted to monitor and control
4 production of the chemical product by the modular system;

5 (b) a reactant supply source for each of said plurality of reactants, a flow of each
6 reactant from its reactant supply source being controlled by the control module; and

7 (c) a first reaction module in fluid communication with each reactant supply
8 source to receive each of the plurality of reactants, said first reaction module being controllably
9 connected to said control module and including a replaceable reactor automatically producing the
10 chemical product from said plurality of reactants under the control of the control module, said
11 replaceable reactor comprising a plurality of simple plates stacked together in layers, each simple
12 plate comprising a first planar surface, and a second planar surface that is opposite to said first planar
13 surface, both said first and said second planar surfaces being substantially parallel, each simple plate
14 further having edge surfaces extending between said first and said second planar surfaces, said
15 reactor including at least two chemical reactant inlet ports and at least one product outlet port for the
16 receipt and discharge of a chemical product, each chemical reactant inlet port and each product outlet
17 port being defined by an opening in a simple plate that penetrates the first planar surface and the
18 second planar surface of the simple plate, but not the edge surfaces of the simple plate, said reactor
19 further including at least two inlet pathways for accommodating the chemical reactants, wherein each
20 inlet pathway is connected in fluid communication with a different one of said chemical reactant inlet
21 ports, said at least two inlet pathways merging within the reactor to form at least one reaction
22 chamber in which at least two chemical reactants can react to generate a chemical product, at least
23 one outlet pathway coupling said at least one reaction chamber in fluid communication with said at
24 least one product outlet port, and wherein each chemical reactant inlet port, inlet pathway, reaction
25 chamber and product outlet port comprises an opening through at least one simple plate aligned with
26 at least a portion of an opening through an adjacent simple plate.

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1 77. A modular system for producing a chemical product from a plurality of reactants comprising:

2 (a) a control module, said control module being adapted to monitor and control
3 production of the chemical product by the modular system;

4 (b) a reactant supply source for each of said plurality of reactants, a flow of each
5 reactant from its reactant supply source being controlled by the control module; and

6 (c) a first reaction module in fluid communication with each reactant supply
7 source to receive each of the plurality of reactants, said first reaction module being controllably
8 connected to said control module and comprising:

9 (i) a housing;

10 (ii) a mounting frame disposed within the housing, the mounting frame
11 being configured to support a reactor; and

12 (iii) a replaceable reactor supported by the mounting frame, said replaceable
13 reactor automatically producing the chemical product from said plurality of reactants under the
14 control of the control module, said replaceable reactor comprising a plurality of simple plates, the
15 simple plates being configured such that aligned openings in the plurality of simple plates achieve at
16 least two reactant fluid pathways, at least one mixing volume, at least one reaction volume, and at
17 least one product fluid pathway.--

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